

Bushfire Regeneration Monitoring
on Farrer Ridge
2003-2008

Data for this report was collected by Farrer Ridge Parkcarers. The report was produced by Jennie Widdowson. Further details and information can be obtained by contacting Jennie on jenniew@ozemail.com.au. Copies of all photos taken as part of the monitoring project are available on request.

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Introduction

Farrer Ridge is a narrow ridge approximately 7km long and 3km wide lying at the southern end of the Woden Valley. It is part of Canberra Nature Park and contains a great diversity of plants with over 160 native species identified in the area. Since 1989, Farrer Ridge Parkcarers have cared for and improved the ridge by removing woody weeds, planting additional trees and shrubs, mapping and monitoring the vegetation and improving the paths and tracks.

On January 18th 2003 Farrer Ridge was almost completely burned by the bushfires which devastated the southern part of the ACT, with only a few small pockets untouched where some of the kangaroo population managed to find refuge. Because Farrer Ridge contains a number of uncommon, rare and endangered plant species, the Parkcarers decided that it would be useful to monitor how the ridge responded to the bushfire and the speed and amount of recovery that could be observed over a 5 year period.

Monitoring methods

Several methods were used to track the changes and recovery of Farrer Ridge. These were:

- Recording all the plants species found on Farrer Ridge and the dates they were first seen or were in flower
- Making a photographic record of a number of different locations to show the broad scale recovery of the vegetation
- Monitoring one particular eucalypt to study the progress of its regeneration
- Adapting the information provided in a monitoring and evaluation manual produced by Greening Australia in 2002 and applying this methodology to four sites on Farrer Ridge which were distinctly different in their vegetation and ecology.

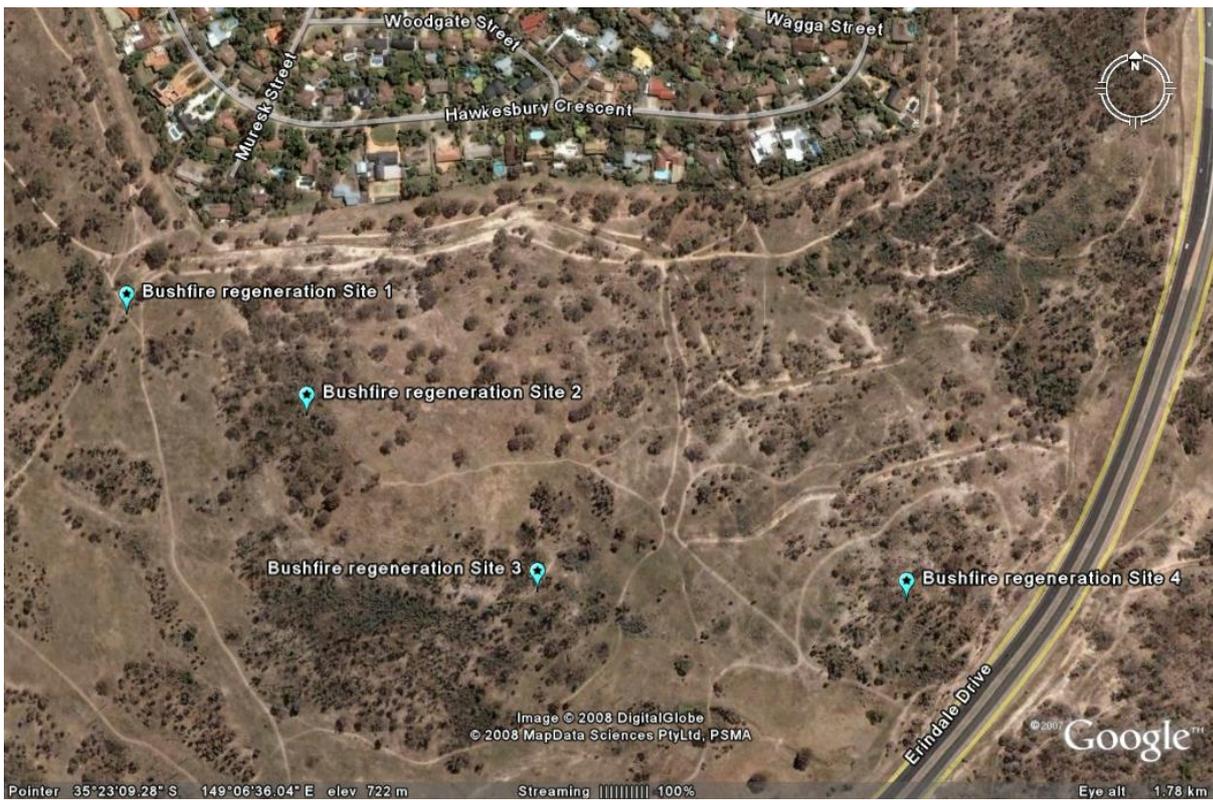
The monitoring sites

The four sites chosen represented different vegetation zones on Farrer Ridge. Site One is on the edge of the red gum/yellow box open woodland. Site 2 is near the top of Farrer Hill where there were peppermint gums (*E. dives*) and there was a dense understorey of spring flowering shrubs. Site 3 is at the edge of the peppermint gum/mealy bundy (*E. nortonii*) woodland and Site 4 is an area of Scribbly gums (*E. rossii*) containing many orchids and spring flowering shrubs.

Each site consisted of a 20 metre equilateral triangle marked out by 3 star pickets painted white for the top 50cm. A photo record of the site was made three times in 2003, then twice yearly in 2004, 2005 and 2006 and then once in 2008 to record the changes in vegetation within the triangles. In addition, records were kept of:

- the number of eucalypt, acacia and shrub species growing within 1 metre of the boundaries of the triangle;
- the identity of all species of trees, shrubs, grasses and weeds growing within the triangle;
- the structural diversity of the area based on a visual assessment of the amount of tree cover, tall shrubs, short shrubs, ground herbage, logs, rocks and forest litter.

Google Earth photo showing Farrer Ridge and the four monitoring sites



Bushfire recovery – the plants

Although Farrer Ridge was almost totally burnt by the 2003 bushfire, there were signs of recovery within 4 weeks of the fire. The smoke cleared from the ridge, grass shoots appeared on the blackened ground and epicormic growth appeared on some of the eucalypts.



Farrer Ridge from Sulwood Drive, 21st Jan 2003



First shoots of grass, 2nd Feb 2003



Epicormic growth on E. bridgesiana

Feb 17th 2003

The new growth that appeared was often unusually coloured. There were bright lime green leaves or deep red and purplish colours, which may have been produced in response to concentrations of minerals in the soil as a result of the fires.

Eucalypts regenerating Mar 17 2003



Red leaves



Pale green and orange leaves

Acacias usually tend to regenerate from seed after fires, but there were numerous examples on Farrer Ridge of acacias regrowing their leaves or sprouting from the base of a burnt trunk.



Acacia dealbata with new leaves Mar 31 2003



Acacia implexa with regenerated leaves (below) Mar 17 2003
Acacia dealbata regenerating from root (above)

Tree seedlings that were planted in October 2002 were burnt to the ground by the bushfire but although they were small and had only been in the ground for 3 months, 2 of the trees were showing signs of regenerating by 19th February 2003. By 4th May 2003, 28 of the new trees were showing signs of life out of the 75 planted (37%). None of the acacias survived the fire.



Newly planted eucalypt regrowing

Feb 19 2003

By mid March 2003, after some good rain, there were signs of regeneration of many plants including *Acacia dealbata*, Rock ferns (*Cheilanthes austrotenuifolia*) and several varieties of eucalypts. By the end of March 2003 (just 2 months after the fires), 23% of the native plants recorded on Farrer Ridge were showing signs of regeneration and recovery as were 17% of the weed species.



Acacia dealbata seedlings

Mar 17 2003



Rock fern seedlings

Of the 133 native plant species (excluding grasses, rushes and ferns) recorded on Farrer Ridge, most of these (91%) had regenerated by the end of 2005, just 3 years after the fire. A detailed list of plants on Farrer Ridge and the dates at which they had regenerated is provided in Appendix 1

Native tree, shrub & herb regeneration on Farrer Ridge		
<i>Year regenerated</i>	<i>No. species</i>	<i>%</i>
2003	52	39.10
2004	28	21.05
2005	41	30.83
2006	3	2.26
2007	0	0.0
Not found since fires	9	6.77
Total native plants	133	

Bushfire recovery – epicormic growth

One particular eucalypt was monitored at regular intervals so that the speed and process of development and recovery from the first epicormic buds to the development of branches 5 years later could be studied. The eucalypt was a large *Eucalyptus bridgesiana* located near the bottom of the Farrer Hill trail and within the first bushfire monitoring site. Photos of the tree and closeups of a particular branch were taken at regular intervals.

The first epicormic growth was visible just 4 weeks after the fire and by 3 months after the fire the tree was covered in bunches of leaves sprouting from its main branches. These bunches of leaves continued to grow and strengthen over the next 5 years and gradually thickened into new branches. No new leaves or branches developed on the thinner branches at the extremities of the tree and these gradually dropped off, thus gradually changing the overall silhouette of the tree.

Early development of epicormic growth on an Apple box gum (*E. bridgesiana*)



17 February 2003



17 March 2003



16 April 2003



1 June 2003

Closeup of later development



19 January 2005



2 April 2006

Progress of development of epicormic growth to new branches on Apple box gum (*E. bridgesiana*)



April 2003



December 2003



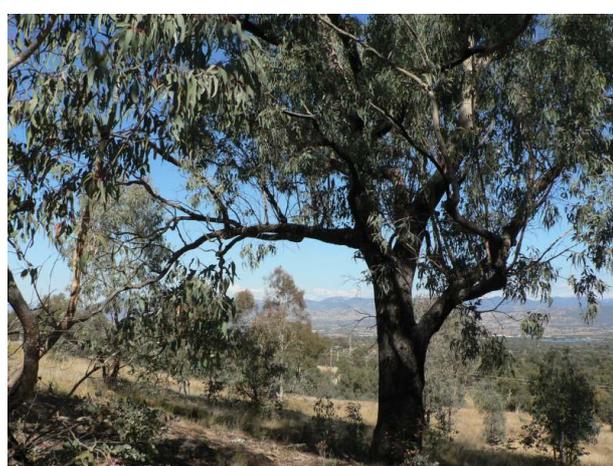
May 2004



October 2004



April 2006



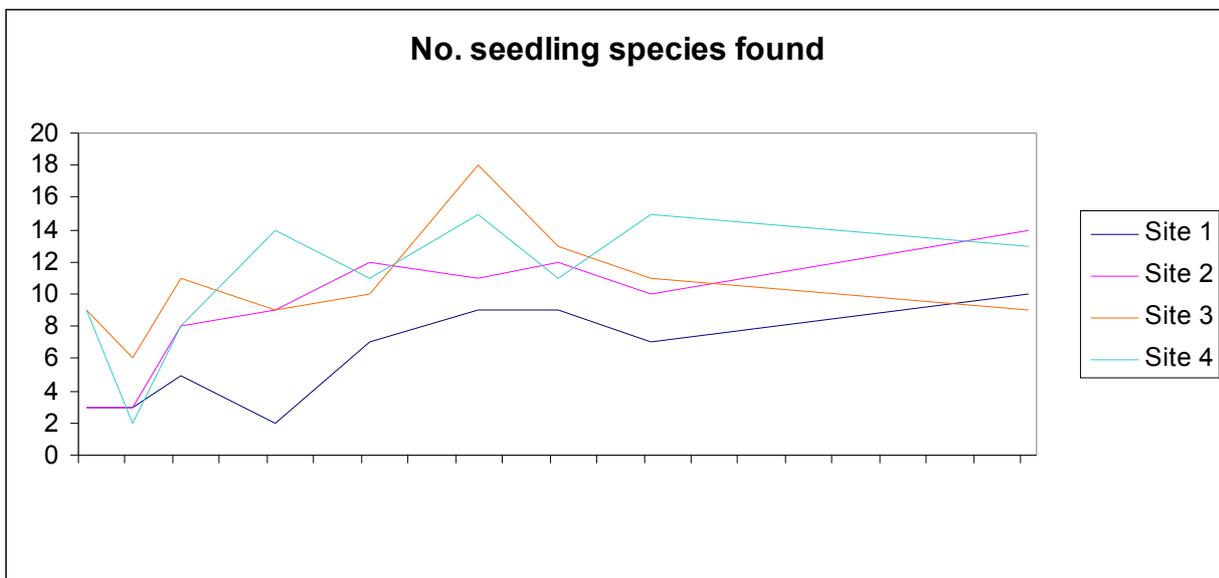
April 2008

Bushfire Recovery - monitoring results

Measurements were taken using the Greening Australia framework for assessing the effects of revegetation and applying some adaptations as we were monitoring bushfire recovery rather than the effects of planting for revegetation.

Recording the numbers of eucalypts, acacias, shrubs and dead trees along the edges of the defined areas did not provide much information as this remained fairly constant during the 5 years (see appendix 2)

Identifying the number of species and their frequency within the triangles was useful in monitoring the overall progress in recovery of each site. This analysis was complicated by the effects of the seasons causing some species to die down and then reappear and also the effects of the drought and seasonal rainfall. However, overall there was an increase in species as can be seen in the graph below. There was also an increase in the number of plants of each species as seeds which had been lying dormant were stimulated by the effects of the fires and the increased minerals in the soil and burst into life. Detailed tables of species and plants can be found in appendix 2



The structural diversity of each site was determined by making a visual assessment of the spatial distribution of vegetation, litter, logs and rocks using the table framework below. Each feature is given a score from 0-3 and these scores are totalled to produce an overall score.

	0-10% (0)	10-20% (1)	20-50% (2)	>50% (3)	Total score
Tree canopy					
Tall shrub 2-4m					
Short shrub 0.5-2m					
	0-10% (0)	10-40% (1)	40-70% (2)	>70% (3)	Total score
Ground herbs					
Logs/rock					
Litter					
Overall score					

The overall scores can be compared to monitor the changes over time for each area.